Fresh Water Pollution: Recreational Bathing Lakes

Background

As of the 2003 bathing season there were 384 beaches on 313 active bathing lakes. Each bathing beach is sampled for the presence of fecal coliform once a week during bathing season, which can vary from one or two weeks to Memorial Day through Labor Day. Members of the bacteria group of coliforms are used as indicators of possible sewage contamination because they are commonly found in human and animal feces. Although they are generally not harmful themselves, they indicate the possible presence of pathogenic bacteria, viruses and protozoans. It is far less difficult, expensive and time consuming to test for these indicators than it is to test directly for the pathogen-causing organisms. Fecal coliforms are a subset of this group and are more fecal-specific in origin. The standard for bathing waters is 200 fecal coliform colonies/one milliliter of sample. If a sample exceeds the standard, the lake is tested again the following day and a sanitary survey is conducted. If the sample again exceeds the standard, the beach is closed to public bathing. It is then sampled daily and remains closed until there is an acceptable resample.

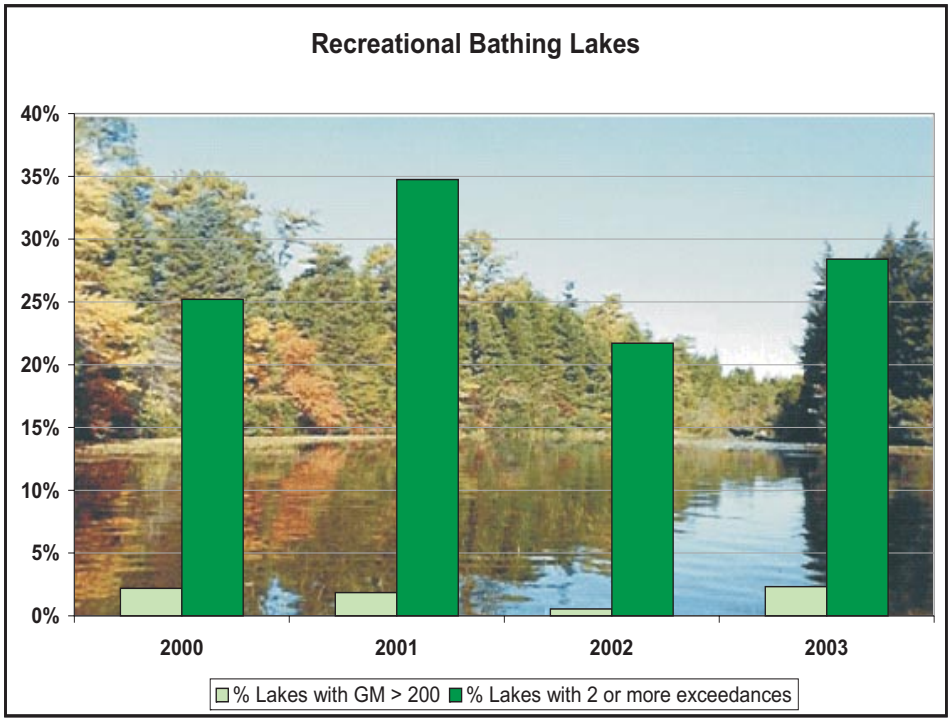
Fecal coliform pollution is suspected to occur primarily from nonpoint source pollution. This refers to pollution coming from a wide variety of sources including domestic pet, livestock, and wild animal wastes transported to lakes by municipal and industrial stormwater; overland runoff; and failing or inappropriately located septic systems. In some localized instances, fecal coliform pollution may be attributed to point source pollution, which refers to pollution coming from a single, known source. Point sources of pollution can include human wastes from combined sewer overflows, failing sanitary sewer infrastructure, and occasionally wastewater treatment plant failures.

Trends

As of the beginning of 2003, 283 of the bathing beaches were recorded within the Department's Geographical Information System (GIS), and 38 were not yet in the system. The following summaries are based only on lakes in the GIS system.

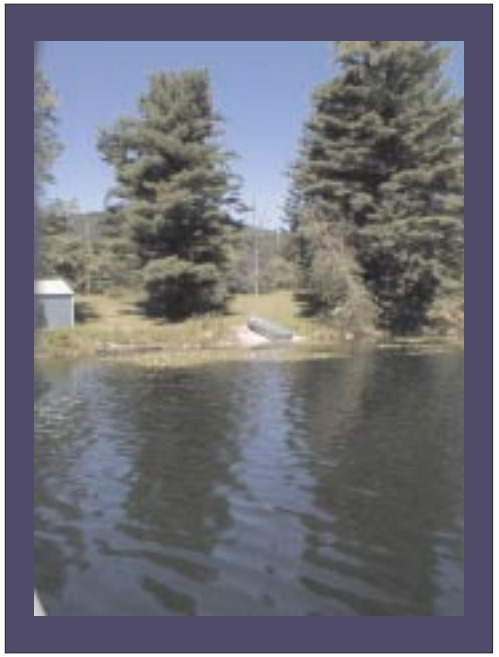
Seventy five percent of bathing lakes achieved full attainment of recreational use, and 25 percent of the lakes did not support the recreational use based on the sanitary quality of their bathing beaches. A lake that exceeds the standard two or more times is considered non-attaining. Enforcement inspections in 2000 and 2001 found the majority of failures probably were caused by nonpoint source factors, especially geese and contaminated stormwater runoff.[1]

The figure below shows the percentage of lakes statewide with an average geometric mean of greater than 200 fecal coliform colonies/one milliliter of sample. It also shows the percentage of lakes, statewide, that did not support the recreational use.



Outlook and Implications

As part of remediation efforts, DEP is developing Total Maximum Daily Loads (TMDL) for a number of lakes. The TMDLs are not specifically addressing fecal coliform, but eutrophication, or waters that are rich in nutrients. Since many of New Jersey's lakes are man-made, they are highly prone to eutrophication, which occurs naturally as lakes age. However, this process can be accelerated by excessive inputs of nutrients and suspended sediments from the surrounding watershed. Eutrophic lakes are characterized by low dissolved oxygen and high algal concentrations. Low dissolved oxygen levels result from the die off and decay of the algae. In addition, the decomposed matter sinks to the bottom, resulting in a dense layer of anoxic, organic deposits where fecal coliform thrive. The organic layer produces nutrients, on which the bacteria feed.[2] Therefore, once implemented, these TMDLs are expected to improve sanitary conditions at lake beaches. Some recommendations resulting from TMDLs could include vegetative buffers around the lakes, goose management, and the removal of outfalls in lakes, all of which would reduce nonpoint source pollution inputs into the lakes.



More Information

www.state.nj.us/dep/wmm/sgwqt/sgwqt.html
www.state.nj.us/dep/wmm/publications.html

References

[1] Harrington, Thomas. NJDEP Division of Watershed Management, Clean Shores Program, personal communication
[2] Gerba, C. P. and J. S. McLeod. 1976. Effects of Sediments on the Survival of Escherichia coli in Marine Waters. Applied and Environmental Microbiology 32: 114-120.

Much of the information in this report was provided by DEP's New Jersey 2004 Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)). June 2004. This report is available at www.state.nj.us/dep/wmm/publications.html